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Marketing Research Report No. 432

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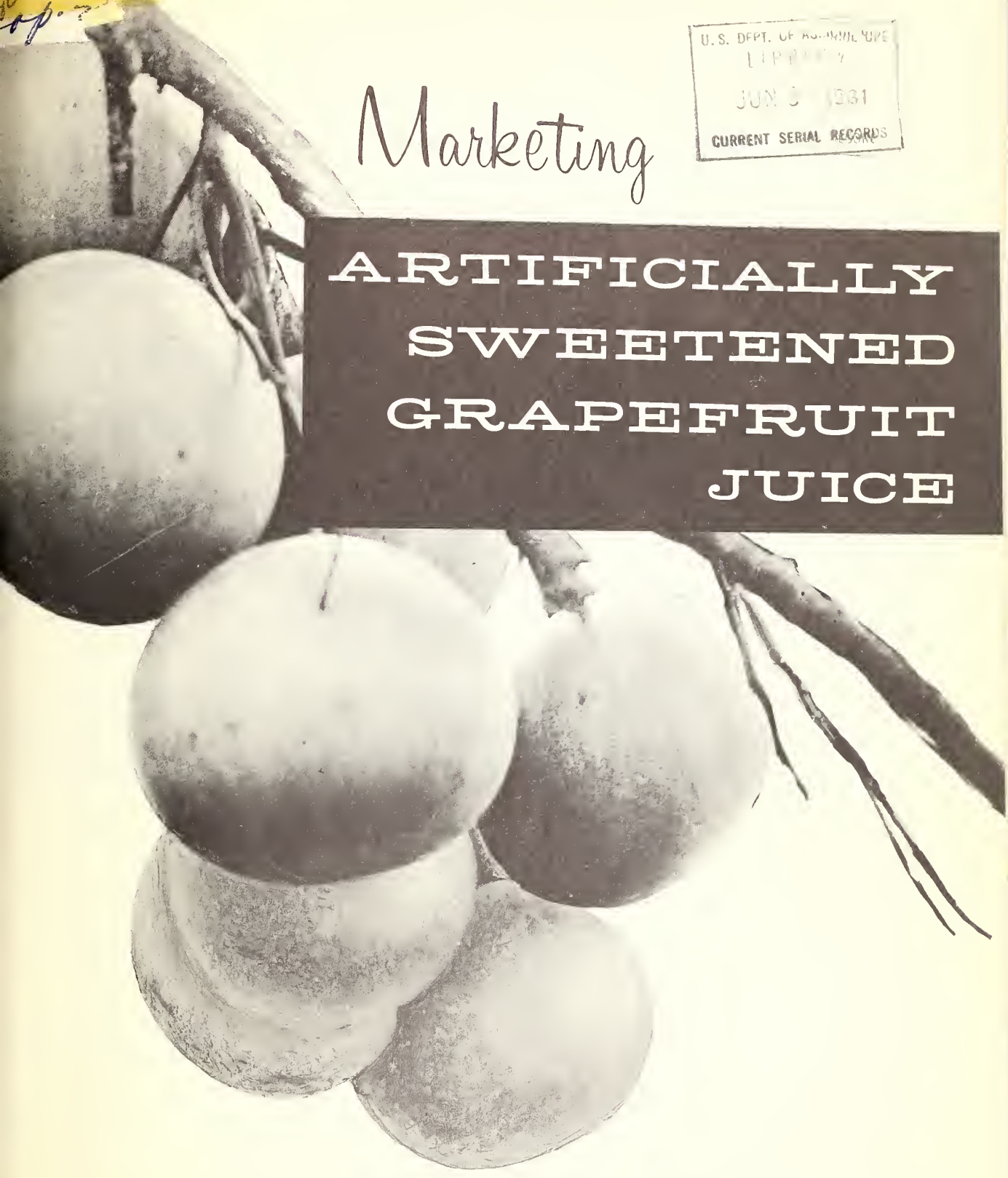
ARTIFICIALLY SWEETENED GRAPEFRUIT JUICE



U. S. DEPARTMENT OF AGRICULTURE
Market Development Research Division
Agricultural Marketing Service

PREFACE

This report evaluates acceptance of artificially sweetened grapefruit juice by consumers when it is sold by retail food stores in large cans (46-ounce) as a general grocery item. It also appraises the product's potential for increasing total sales of canned grapefruit juice.

The study, part of a broad research program designed to expand the demand for and increase efficiency in marketing agricultural products was conducted in Fort Wayne, Ind., by the Market Development Research Division of the Agricultural Marketing Service under general supervision of George H. Goldsborough and Trienah Meyers.

The Florida Citrus Commission cooperated by arranging for the processing and packaging of the test product, securing the cooperation of the retail trade in making shelf space available for the product, and conducting the promotional program. Frank D. Arn and Ralph Henry directed the participation of the Commission. The merchandising and promotional program for the test product was supervised by the Commission's field merchandising representatives. An artificially sweetened grapefruit juice had not previously been available in Fort Wayne.

Appreciation is extended to the management and operating personnel of Fort Wayne food stores that participated in the study and to the food wholesalers and the A. C. Thomas Co. for their contribution. Snively Groves, Inc., processed the test product and arranged for distribution. Mr. W. W. Giddings of that firm contributed substantially to the success of the study.

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Washington, D. C. September 1960

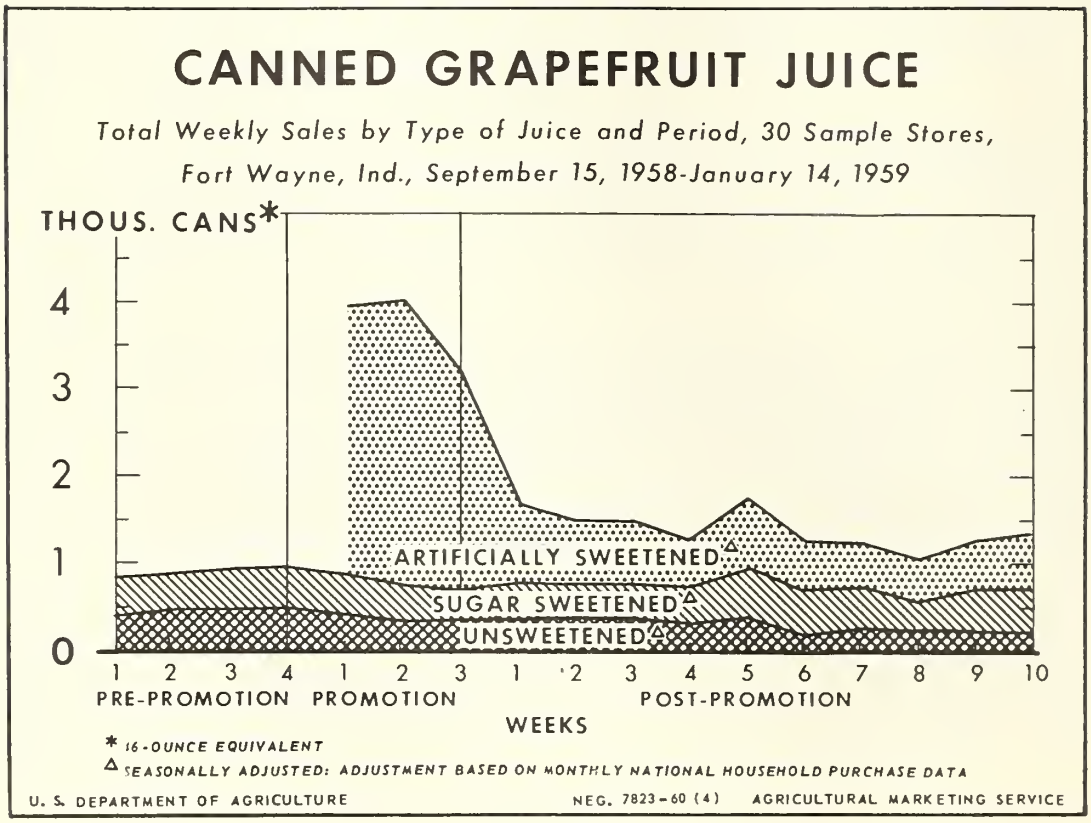
CANNED GRAPEFRUIT JUICE
Total Weekly Sales by Type of Juice and Period, 30 Sample Stores,
Fort Wayne, Ind., September 15, 1958-January 14, 1959
THOUS. CANS*
4
3
2
1
0
ARTIFICIALLY SWEETENED△
SUGAR SWEETENED△
UNSWEETENED△
1 2 3 4 1 2 3 1 2 3 4 5 6 7 8 9 10
PRE-PROMOTION
PROMOTION
POST-PROMOTION
WEEKS
* 16-OUNCE EQUIVALENT
△ SEASONALLY ADJUSTED: ADJUSTMENT BASED ON MONTHLY NATIONAL HOUSEHOLD PURCHASE DATA
U. S. DEPARTMENT OF AGRICULTURE
NEG. 7823-60 (4)
AGRICULTURAL MARKETING SERVICE

FIGURE 1

MARKETING ARTIFICIALLY SWEETENED GRAPEFRUIT JUICE

By Robert E. Frye, J. Scott Hunter, and Michael G. Van Dress
Market Development Research Division
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SUMMARY

Research conducted in Fort Wayne, Ind., indicated that artificially sweetened grapefruit juice contributed substantially to greater total sales of canned grapefruit juice and was highly acceptable to consumers in that market. The juice was sweetened with a noncaloric agent.

Average weekly sales of all canned single-strength grapefruit juice in sample stores increased from 895 cans (46-ounce equivalent) during a 4-week prepromotion period prior to the introduction of artificially sweetened juice to 3,727 cans during the 3-week promotion period which began when the test juice was marketed. During a 10-week postpromotion period, total sales of canned grapefruit juice averaged 1,372 cans per week, or 53 percent more than in the 4-week period prior to the promotion of artificially sweetened juice.

Artificially sweetened juice outsold regular grapefruit juice by almost 4 to 1 during the promotion period and was equivalent to 87 percent of the combined sales of sugar sweetened and unsweetened grapefruit juice during the postpromotion period (fig. 1).

About 43 percent of the Fort Wayne homemakers, interviewed almost 3 months after the promotion stopped, indicated that they were users of canned grapefruit juice. Of these about a third, or 13 percent, bought one or more cans of artificially sweetened grapefruit juice.

Two-thirds of the users of the test product were repeat purchasers and half of the repeat purchasers had bought the product 4 or more times during the 13 week period it was available to Fort Wayne consumers.

Almost all users of the artificially sweetened grapefruit juice expressed complete satisfaction with the product. Most of the favorable replies referred to its flavor as a reason for satisfaction. However, only 1 user in 5 mentioned the noncaloric sweetener as a reason for satisfaction.

Sales data show that purchases of sugar-sweetened grapefruit juice were not adversely affected by the availability of the artificially sweetened juice. In fact, sales of sugar-sweetened juice averaged slightly higher in the postpromotion than in the prepromotion period.

On the other hand, sales of unsweetened grapefruit juice dropped somewhat after the introduction of artificially sweetened juice in the market and continued at a still lower level during the postpromotion period. However, part of this sales decline may be attributed to factors other than competition from artificially sweetened juice. Out-of-stock and low stock positions in some stores as well as price may have been contributing factors to lower sales.

Results of the consumer survey show that homemakers in half of the households where repeat purchases of artificially sweetened juice were made thought they had increased their total purchases of grapefruit juice since buying the test product, while only 4 percent thought they were using less.

Retail store audits indicated that sales of canned and frozen grapefruit sections, frozen concentrated grapefruit juice, and canned orange-grapefruit and tomato juices were not significantly affected by the availability of artificially sweetened canned grapefruit juice.

The promotion of artificially sweetened juice during the 3-week promotion period, although encompassing only in-store demonstrations and special displays, was highly effective in inducing shoppers to buy the product. This is shown by both sales results and consumer awareness of the promotional activity.

Weekly sales of all grapefruit juice in nondemonstration stores were about 1.5 times greater during the promotion period than in the prepromotion period when artificially sweetened juice was not available; sales in demonstration stores where shoppers were offered free taste samples of the new juice increased more than 5.5 times. In stores where demonstrations were conducted, sales of artificially sweetened juice during the demonstration week were markedly higher than in either the preceding or following week when demonstrations were not held. However, little carryover effect from demonstrations was noted.

The survey shows that promotion of the test juice caused 40 percent of all homemakers, representing a wide range of background characteristics, to become aware of its availability in Fort Wayne stores. Users of canned grapefruit juice were found to be more aware of the test product's availability than nonusers. About 40 percent of all homemakers interviewed had seen special displays of the juice and 20 percent had observed or participated in the in-store demonstrations. Although the promotion of artificially sweetened juice proved effective in establishing awareness of the availability of the new product and in producing sales it was less effective in getting across the story that the juice was an artificially sweetened product. Only about 3 in 10 of the respondents who were aware of the availability of the juice were able to identify the specific characteristic that differentiated this product from other canned grapefruit juice.

About half of Fort Wayne homemakers in the sample felt that use of artificial sweeteners in food products was acceptable as a general proposition; 1 in 4 did not express an opinion; and another 1 in 4 did not favor this practice. None of the canned grapefruit juice users who were aware of the test product but had not purchased it indicated that use of an artificial sweetener in the product was a deterrent to its use. On the basis of reported heights and weights of adult members of households surveyed, about a third were classified as overweight, about the same proportion were concerned with the problem.

Sales data show that purchases of artificially sweetened juice were fairly stable in the postpromotion period. Almost all buyers of the test product interviewed indicated that they would continue to buy artificially sweetened grapefruit juice if it were available.

BACKGROUND AND OBJECTIVES

Research was conducted at the request of the Florida Citrus Commission, representing growers, processors, and shippers of citrus fruits, to determine the market potential of an artificially sweetened grapefruit juice when promoted and merchandised as a regular grocery item rather than as a dietetic food. Specifically, the objective was to appraise the contribution that such a product so marketed might make in expanding the demand for grapefruit. The research was conducted in Fort Wayne, Ind., September 1958-January 1959.

Despite low production of grapefruit in 1957 and 1958 because of adverse weather, the industry continues to have serious problems in marketing all of its grapefruit. With a return to normal production and with increased production anticipated from current nonbearing acreage, the marketing problem may well become acute.

Unlike the situation for oranges, where processed products utilize a major proportion of the supply, processed grapefruit products continue to be, to a large extent, diversionary outlets for grapefruit that cannot readily be marketed in fresh form. While the introduction of frozen concentrated and chilled grapefruit juice and frozen and chilled grapefruit sections in recent years has broadened the marketing base for grapefruit, canned single strength juice and canned sections continue to be the major processed items. Per capita consumption of canned grapefruit juice has trended downward since 1946, reducing the importance of this outlet, while pack and movement data for canned sections indicate at best only a stable market for this product.

Over the past few years another processed grapefruit product, artificially sweetened grapefruit juice, has been considered by the industry and has been offered in limited volume as a dietetic item. These primarily experimental packs were available only in small cans, and when offered by retail food stores the product was generally displayed in the dietetic section and priced somewhat higher than an equivalent volume of sugar-sweetened or unsweetened canned grapefruit juice. Apparently these packs met with only limited trade acceptance; therefore, its availability has not significantly affected the overall market or consumer acceptance for grapefruit products.

In view of the relatively unsatisfactory combined marketing performance of processed grapefruit products, questions arise as to the reasons for this and as to ways in which consumer demand could be enhanced.

Research findings, for example, indicated that consumers give higher preference ratings to sugar sweetened grapefruit juice than unsweetened juice and to a juice of 9 or higher brix-acid ratio than to a less sweet 7 brix-acid ratio juice. 1/ If industry is guided by these preference ratings, it is quite possible that a juice of the sweetness preferred by consumers could not be provided from unsweetened natural juice in some parts of the marketing season.

1/ Bell, H. P. Preference for Canned Grapefruit Juice. Mktg. Res. Rpt. No. 108, U. S. Dept. Agr. Dec. 1955.

It is estimated that more than 20 percent of the adult population of the United States are overweight. 2/ The proportion of the overweight people that want to reduce is not known, but it is believed that there is increasing awareness of health problems that may result from excess weight.

Based on the fact that consumers favor a sweeter grapefruit juice than is provided in all instances by natural juice and the need or desire of a sizable proportion of the population to restrict caloric intake, the industry felt that an artificially sweetened grapefruit juice could be successfully marketed.

Cost information indicates that an artificially sweetened grapefruit juice can be packed and sold at a price competitive with sugar sweetened juice. It was decided, therefore, that the market potential of this juice should be evaluated under more realistic conditions than had previously been possible. These conditions include: (1) that artificially sweetened test juice should be equally as sweet or sweeter than the sugar sweetened 9 brix-acid juice and nondiscriminable from or superior in taste to it; (2) that the test juice be offered and promoted as a regular low calorie juice rather than as a dietetic item; (3) that it be sold only in 46-ounce cans so as to encourage display in the regular juice section of the store; and (4) that it be priced approximately the same as sugar sweetened juice.

Description of Test Product

A juice meeting the desired characteristics in respect to product and price was packed by a Florida processor and made available for test marketing.

Laboratory tests conducted by the Department indicate that the natural brix-acid ratio of samples of the juice prepared for the market test was approximately 9 with degrees brix constant at 10. The artificial noncaloric sweetener made the juice taste sweeter than the physical measurement would lead one to expect. A taste panel was unable to discriminate between the test juice and a sugar sweetened juice of brix-acid ratio of approximately 11 with degrees brix constant at 10. 3/ The juice was packed only in 46-ounce cans and under the processor's own brand. The label was basically similar in design to that of the packer's other products except for the product description. Although marketed under a nationally available brand label, artificially sweetened grapefruit juice had not been previously marketed in the test city and only 3 of the 30 sample stores had previously stocked other juice products of this brand on a regular basis.

THE TEST MARKET

The test city, Fort Wayne, is located in the northeastern part of Indiana, and is the second largest city in the State. Allen County, in which Ft. Wayne

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2/ Morgan, A. F., and Odland, L. M. The Nutriture of People. Food, Yearbook of Agriculture, U. S. Dept. Agr., 1959, p. 215.

Swanson, Pearl. Nutritional Needs After 25. Food, Yearbook of Agriculture, U. S. Dept. Agr., 1959, p. 314.

3/ To determine whether or not the artificially sweetened grapefruit juice was discriminably different from the sugar sweetened juice, a standard sensory difference test, the duo-trio, was administered to 50 untrained judges.

is located, had an estimated population of 220,000 at the beginning of 1958, with Fort Wayne accounting for 148,000 of this total. 4/

Because of its location, the primary trading area of Fort Wayne encompasses a population composed of about 69 percent urban, 18 percent suburban, and 13 percent rural families.

Manufacturing is highly important in Fort Wayne with three major industries--electric, automotive, and electronics--accounting for about 50 percent of local income. The other 50 percent of income is derived from other manufacturing, service industries, and agriculture. Allen County in 1958 was the second ranking county in Indiana in total agricultural income.

In mid-1958, almost 11 percent of the labor pool was unemployed. Indications are that unemployment was reduced slightly in late 1958 and early 1959 but remained a factor during the test period. A work stoppage at one of the manufacturing plants resulted in a sizable number of unemployed during almost 3 weeks of the postpromotion period.

It is estimated that there were 144 retail food stores in Allen County with a total annual sales volume of about $50 million in 1958. 5/

The 30 sample stores were selected from among the larger supermarkets. The sample stores are estimated to have accounted for 70 to 75 percent of total retail food sales in Allen County, and a slightly higher proportion of sales in Fort Wayne. Only two sample stores were located outside the corporate limit of Fort Wayne.

Although all Fort Wayne stores were not included in the study, the test product was available to all stores, chains and independents, and with few exceptions was stocked by all of the larger stores.

PROCEDURE

Retail Store Audits

Beginning September 15, 1958, and continuing for a 17-week period, weekly sales of all canned grapefruit juice, and sections, canned orange-grapefruit blended juice, tomato juice, frozen grapefruit sections, and frozen concentrated juice containing grapefruit were audited in 30 sample stores.

The purpose of these audits was to provide sales data which would permit an assessment of the marketability of artificially sweetened grapefruit juice when offered by retail food stores, and to determine the effect of the availability of this juice on the total demand for grapefruit products, primarily canned grapefruit juice.

4/ Advertisers Guide to Marketing for 1959, Printers Ink, Oct. 31, 1958.
5/ Estimated by Fort Wayne Newspapers, Inc.

Audits were made on Monday, Tuesday, and Wednesday so as to offer the least interference with store customer traffic. Each store was audited at about the same hour and on the same day of each week to assure equal length of sales periods.

On October 13, 1958, after weekly sales of canned grapefruit juice and competing products had been measured for a 4-week period to provide benchmark data for subsequent sales comparisons, artificially sweetened grapefruit juice was introduced in the market.

All retailers were requested to price the artificially sweetened juice competitively with sugar sweetened grapefruit juice and to display the product in the store's regular juice section. Additional stocking in the dietetic section of the store was suggested but not urged. Prices charged for the 46-ounce can of artificially sweetened juice varied among sample stores from 31 to 39 cents, averaging 34 cents, during the study. The price initially established by each sample store did not change throughout the study.

Simultaneously with the introduction of artificially sweetened juice, a promotional campaign for it was initiated by the merchandising staff of the Florida Citrus Commission and continued for 3 weeks. Promotion included special displays using appropriate in-store promotional materials and in-store demonstrations in which free samples of the juice were offered to shoppers in selected sample stores. In-store demonstrations were conducted on Thursday, Friday, and Saturday of each week during the 3-week period.

Some special displays erected during the promotion remained for varying periods of time, but no promotional effort was exercised by the Commission after this period.

There was no other advertising or promotion of artificially sweetened juice at any time during the study.

Although weekly audits were continuous during the 17 weeks, the study was divided for purposes of analysis into a 4-week prepromotion period, a 3-week promotion period, and a 10-week postpromotion period.

The Household Survey

During the last 3 weeks of January 1959, a survey was conducted with a representative sample of Fort Wayne homemakers. 6/ The specific objectives of the survey were (1) to obtain estimates of the effectiveness of the promotion in attracting homemakers' attention to the test product and in creating interest in trying it, (2) to weigh the opinions of the product among homemakers who had bought it, (3) to estimate the likelihood of continued use of the artificially sweetened juice and its effect on the market for grapefruit juice, (4) to explore possible limitations to the market for the test product, and (5) to provide some indication of the proportion of people who are overweight, concerned about overweight, or are on special diets.

6/ For a description of the sample see the technical notes on page 28 of the Appendix.

AUDIT RESULTS

Sales of Grapefruit Juice

During the 3-week promotion an average of 2,963 cans (46-ounce) of artificially sweetened juice and 764 cans (46-ounce equivalent) of sugar-sweetened and unsweetened juice per week were sold in the 30 sample stores compared with 895 cans of grapefruit juice per week in the 4 preceding weeks (table 1). 7/

Sales of artificially sweetened juice dropped sharply at the end of the promotion, but averaged 637 cans per week during the 10-week postpromotion period, or about one-fifth of average weekly sales during the promotion. Sales were substantially higher than for either unsweetened or sugar-sweetened juice during these 10 weeks. Average weekly sales of artificially sweetened juice equaled 92 percent of the combined sales volume of unsweetened and sugar-sweetened juice in 46-ounce cans, and 87 percent of sales in all can sizes. In addition, total sales of canned grapefruit juice (artificially sweetened included) averaged 1,372 equivalent 46-ounce cans per week, or 53 percent more than in the prepromotion period (table 1).

Sugar-sweetened grapefruit juice appears to have been unaffected by the availability of artificially sweetened grapefruit juice in Fort Wayne stores even though it averaged between 1 and 2 cents more per 46-ounce can during the postpromotion than artificially sweetened juice (figs. 2 and 3).

On the other hand, sales of unsweetened grapefruit juice dropped somewhat upon the introduction of artificially sweetened juice and continued lower during the postpromotion. The greatest decline, however, occurred in the fourth week of the postpromotion (fig. 4). Although an out-of-stock position (only 17 stores out of 30 maintained a continuous stock during the entire study) and low stocks in a number of other stores undoubtedly contributed to this decline, other factors appear to have been also responsible. Prices for unsweetened juice averaged about 3 cents per 46-ounce can higher than for artificially sweetened juice during the 10-week postpromotion period, with a spread of 4 cents per can during 4 of the last 5 weeks of the test. Whether for out-of-stock and low-retail-stock positions, price or product difference, or other reasons, sales of unsweetened grapefruit juice declined substantially in the postpromotion period. Nevertheless, any adverse effect on sales of unsweetened canned grapefruit juice that may be attributed to artificially sweetened juice was more than offset by its plus contribution to total sales of canned grapefruit juice.

Sales of Competing Items

Sales of orange-grapefruit blended juice in the postpromotion averaged almost 6 percent lower than in the prepromotion. The price of blended juice averaged 40 cents per 46-ounce can in contrast to an average of 34 cents for artificially sweetened juice. So even with this sizable price advantage, artificially sweetened juice does not appear to have had a very significant effect on sales of orange-grapefruit blended juice (fig. 5).

7/ Sales of canned grapefruit juice, as well as competing products audited, have been adjusted for seasonal variation indicated by national household purchase data unless otherwise indicated. For adjustment factor see Appendix page 28.

Table 1.--Canned single-strength grapefruit juice, average weekly sales and display inventories by periods, 30 sample stores, Fort Wayne, Ind., September 15, 1958-January 14, 1959

Type	Prepromotion (4 weeks)		Promotion (3 weeks)		Postpromotion (10 weeks)			
	Sales 1/	Inventory 2/	Sales 1/	Inventory 2/	Sales 1/	Change from pre-promotion period	Inventory 2/	Change from pre-promotion period
	Cans	Cans	Cans	Cans	Cans	Percent	Cans	Percent
Unsweetened (46-ounce cans)	427	489	331	527	266	-38	405	-17
Total (all sizes)	457	552	351	581	286	-37	477	-14
Sugar sweetened (46-ounce cans)	394	1,166	385	1,158	423	7	1,027	-12
Total (all sizes)	438	1,378	413	1,356	449	3	1,216	-12
Total unsweetened and sugar sweetened (all sizes)	895	1,930	764	1,937	735	-18	1,693	-12
Artificially sweetened (46-ounce cans)	---	---	2,963	2,564	637	---	912	---
Grand total	895	1,930	3,727	4,501	1,372	53	2,605	35

1/ Sales have been seasonally adjusted based on national consumer monthly purchase data. For example, actual total sales of grapefruit juice were 41 percent higher in the postpromotion period than in the prepromotion period rather than 53 percent shown after adjustment for seasonality.

2/ Includes shelf stock as well as other displayed stock at time of audit on Monday, Tuesday, and Wednesday each week. Excludes stockroom inventories.

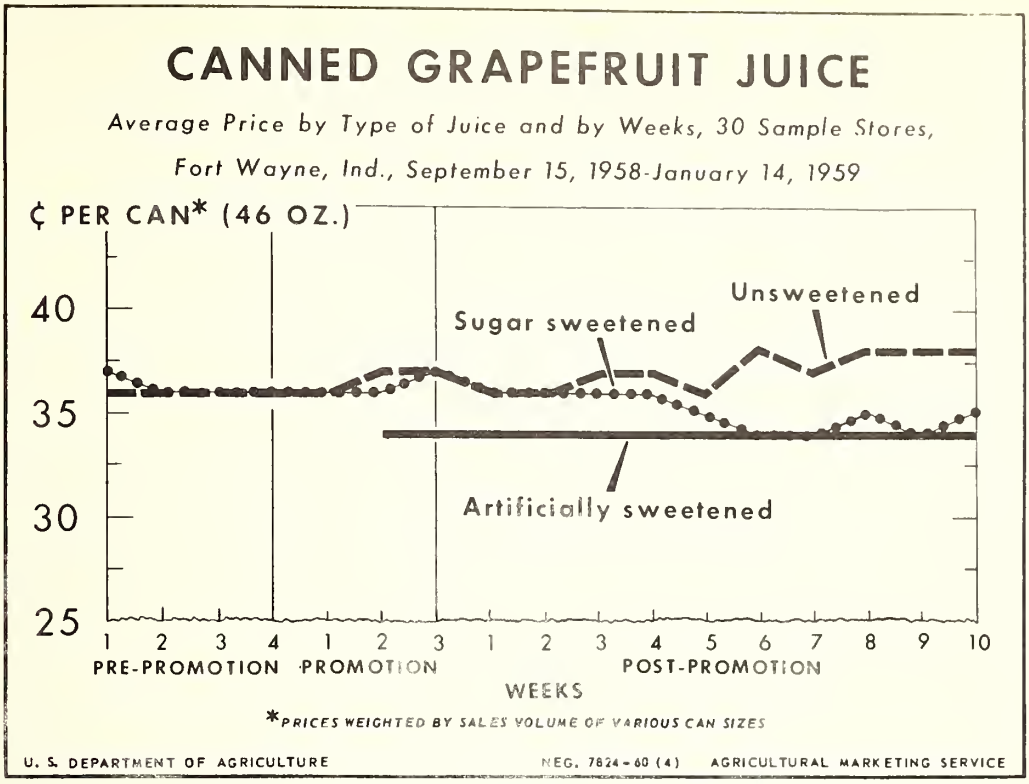
CANNED GRAPEFRUIT JUICE
Average Price by Type of Juice and by Weeks, 30 Sample Stores,
Fort Wayne, Ind., September 15, 1958-January 14, 1959
¢ PER CAN* (46 OZ.)
40
35
30
25
Unsweetened
Sugar sweetened
Artificially sweetened
1 2 3 4 1 2 3 1 2 3 4 5 6 7 8 9 10
PRE-PROMOTION
PROMOTION
POST-PROMOTION
WEEKS
*PRICES WEIGHTED BY SALES VOLUME OF VARIOUS CAN SIZES
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FIGURE 2

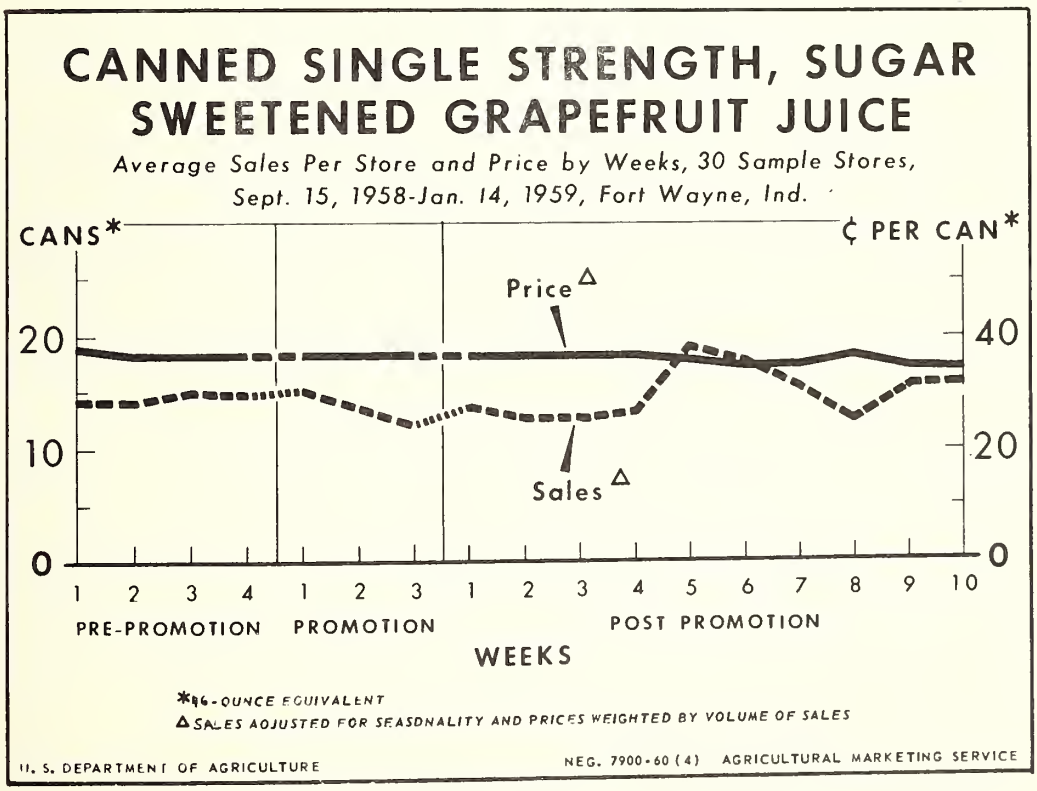

FIGURE 3

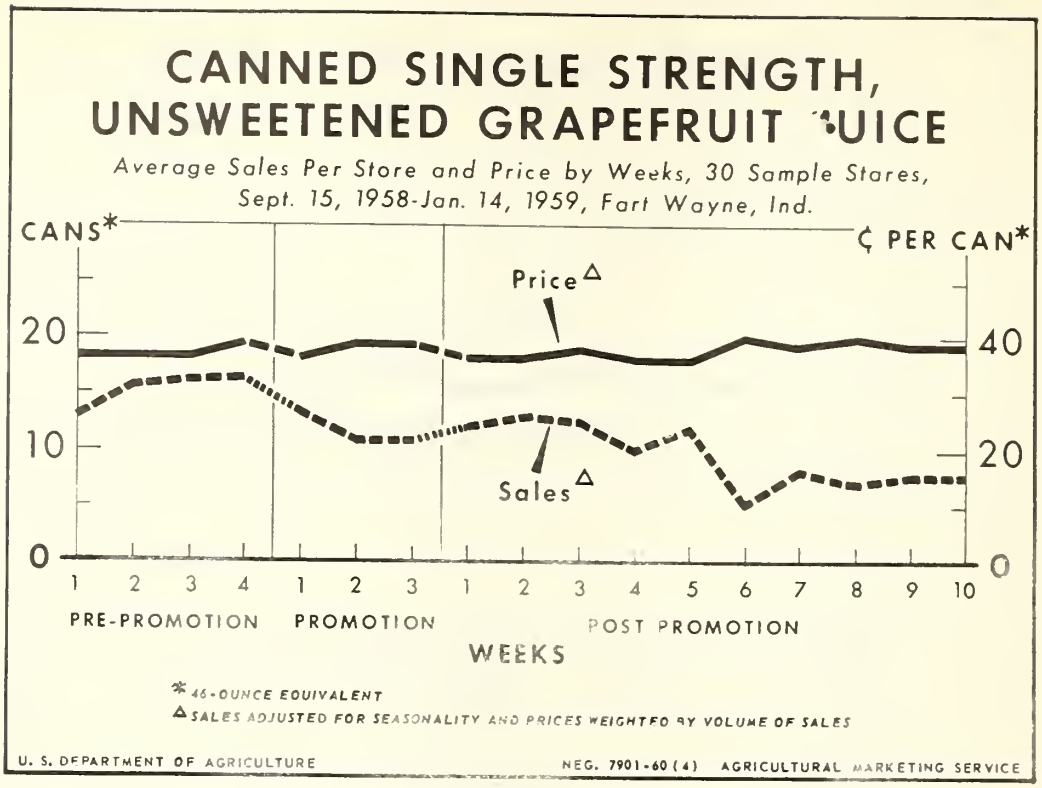

FIGURE 4

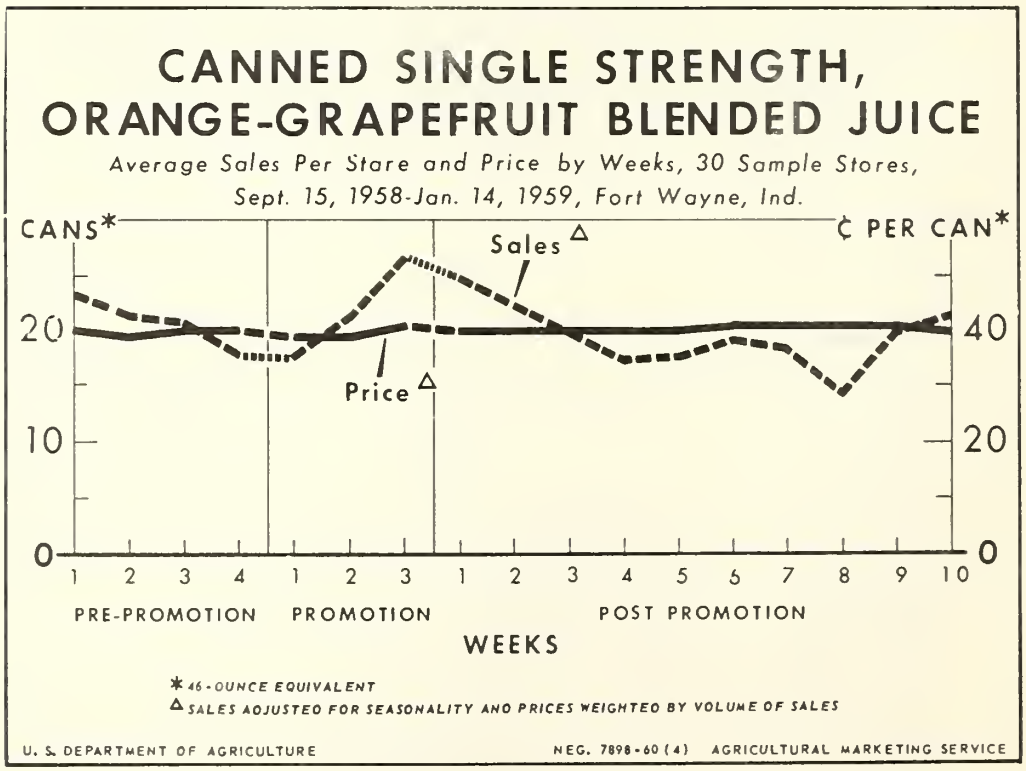

FIGURE 5

Tomato juice was frequently advertised and price-featured by sample stores, and considerable variation occurred in sales of this product from week to week. However, there was little variation in average weekly sales of tomato juice during the three periods of the test (fig. 6).

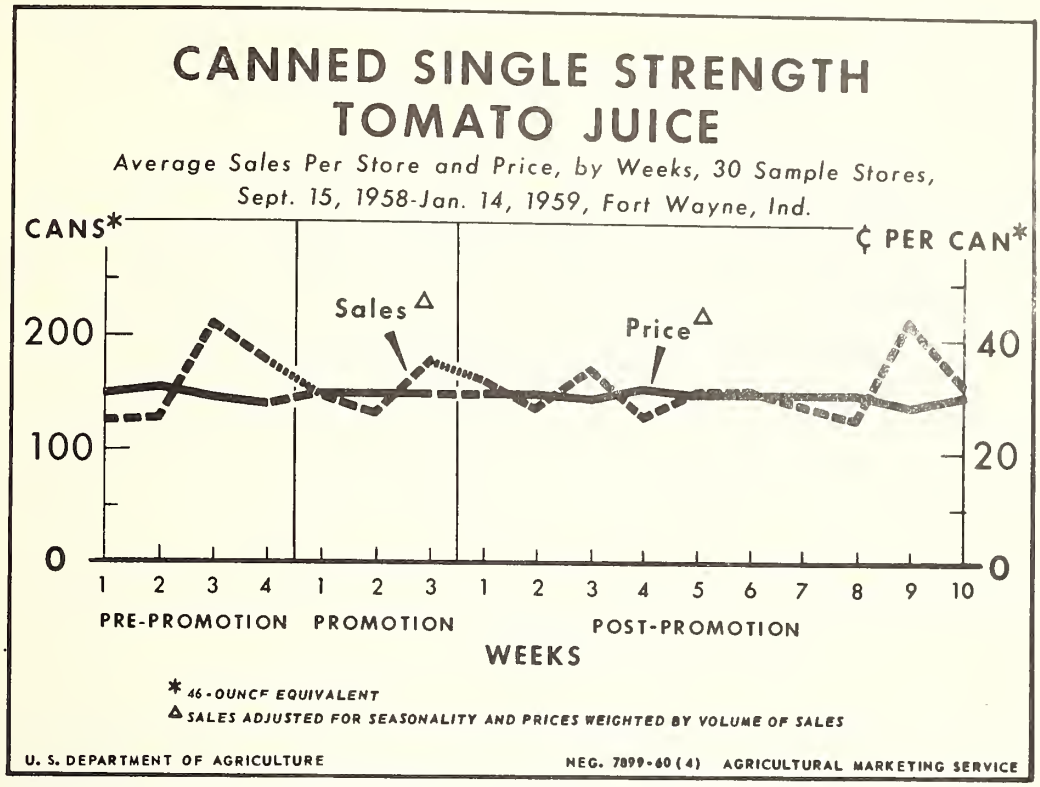
CANNED SINGLE STRENGTH TOMATO JUICE
Average Sales Per Store and Price, by Weeks, 30 Sample Stores, Sept. 15, 1958-Jan. 14, 1959, Fort Wayne, Ind.
CANS*
¢ PER CAN*
Sales Δ
Price Δ
200
100
0
40
20
0
1 2 3 4 1 2 3 1 2 3 4 5 6 7 8 9 10
PRE-PROMOTION
PROMOTION
POST-PROMOTION
WEEKS
* 46-OUNCE EQUIVALENT
Δ SALES ADJUSTED FOR SEASONALITY AND PRICES WEIGHTED BY VOLUME OF SALES
U. S. DEPARTMENT OF AGRICULTURE
NEG. 7899-60 (4) AGRICULTURAL MARKETING SERVICE

FIGURE 6

Sales of frozen grapefruit sections decreased when artificially sweetened grapefruit juice was introduced, but increased substantially during the post-promotion. Part of the variation in sales may have been caused by the amount of display space given to frozen sections rather than the influence of the test product. Display space decreased by 38 percent in the promotion period, and this was accompanied by a 47 percent decrease in sales. During the postpromotion, display space increased 180 percent over the prepromotion period and sales increased 38 percent. 8/

Weekly sales of canned grapefruit sections in sample stores during post-promotion were about 19 percent lower than in the prepromotion period; however, during the fourth week of the latter period sales were well above average owing to promotion and price concessions (fig. 7). High sales during this week served to inflate prepromotion sales and to make postpromotion sales appear less favorable than if more comparable conditions had prevailed. If sales during the fourth week were eliminated from the prepromotion average, there would be little change in average weekly sales volume between the two periods.

8/ Sales figures for frozen grapefruit sections are actual. Adequate data were not available to determine seasonality of consumption.

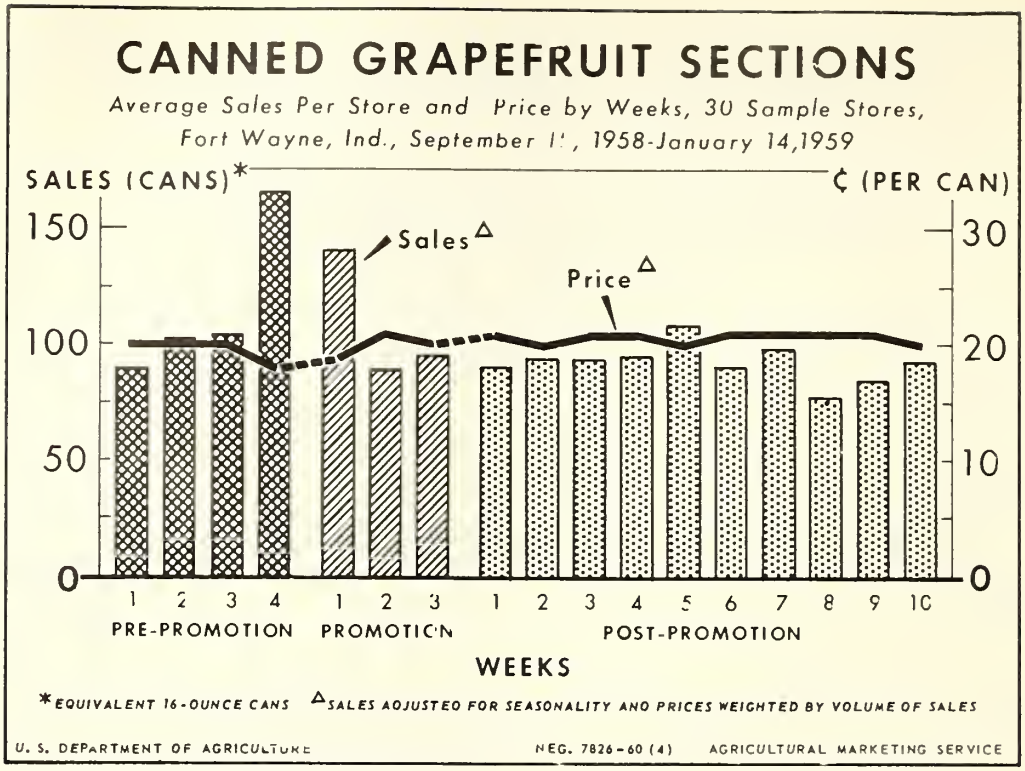

FIGURE 7

Essentially the same conditions prevailed in the prepromotion for frozen concentrated grapefruit juice as for canned grapefruit sections. During the last week of the prepromotion period, frozen grapefruit juice was advertised and price featured. It sold for 33 cents, the lowest average price per can (46-ounce equivalent basis) during the study. Average sales between the pre-promotion and promotion periods would be about the same if sales for the fourth week of the former period were not considered. Average sales for the postpro-motion increased about 6 percent over the prepromotion period (fig. 8).

There does not appear to have been any interaction between sales of the test product and frozen orange-grapefruit juice during the period studied (fig. 8). However, the price of frozen concentrated orange-grapefruit juice hit a peak during the introduction of artificially sweetened grapefruit juice causing a depressing effect on its sales.

Throughout the 17-week study, frozen concentrated pineapple-grapefruit juice was featured in newspaper advertisements three times in the prepromotion period. Reduced prices accompanied this advertising and together these factors were associated with a considerable increase in sales of the product in this period (fig. 8).

For all products audited, unsweetened grapefruit juice appears to have been the only product for which sales were significantly lower after the introduction of artificially sweetened grapefruit juice.

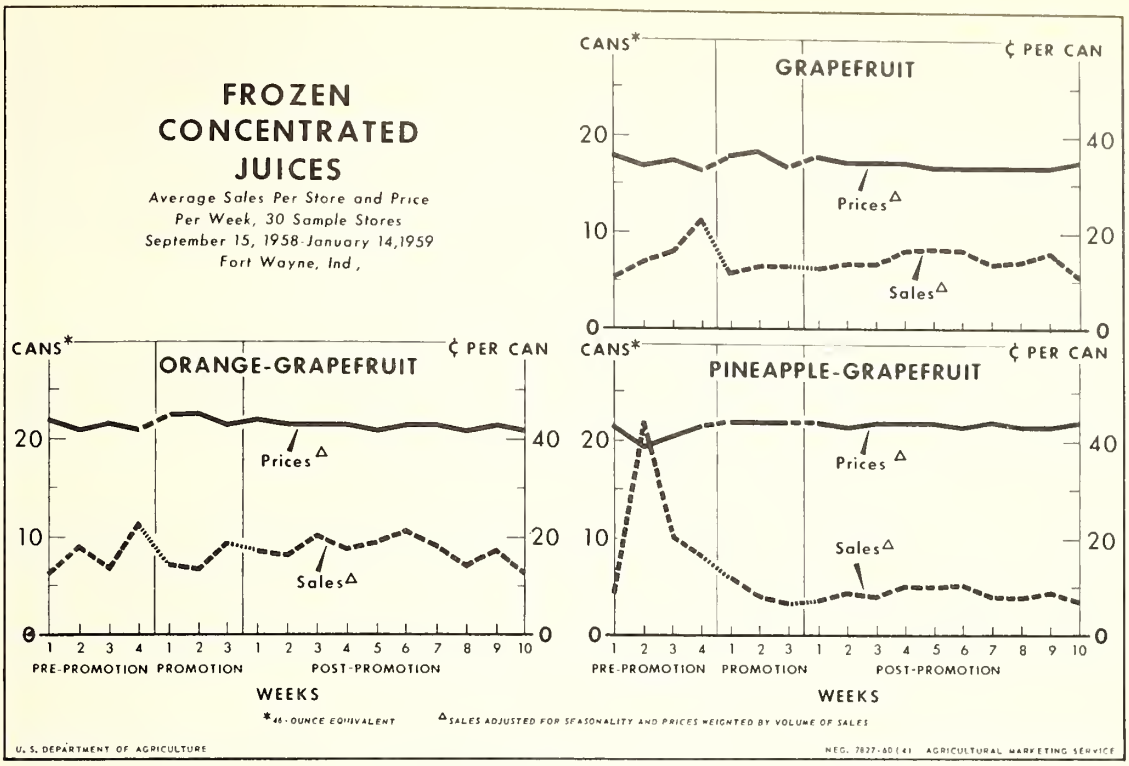

FIGURE 8

Display Inventories

The introduction of artificially sweetened grapefruit juice resulted in more total display space for grapefruit juice. Combining both regular shelf and special displays in the sample stores, 133 percent more space was given to canned grapefruit juice in the promotion period and 35 percent more in the post-promotion period than in the prepromotion period (table 1). The number of 46-ounce cans of grapefruit juice displayed during the postpromotion period was up about 41 percent from the prepromotion period.

During the 3 weeks when artificially sweetened juice was introduced and promoted, using special displays in many instances, the combined display inventory of unsweetened and sugar-sweetened juices was slightly larger than in the prepromotion period. However, in the postpromotion period when the artificially sweetened juice was not generally featured, it appears to have given the regular canned juice more direct competition for shelf space. During this period the average number of 46-ounce cans of both unsweetened and sugar-sweetened juice displayed averaged about 13 percent lower than the base period, with 46-ounce cans of unsweetened juice down about 17 percent. A contributing factor to smaller displays of unsweetened juice may well have been due to the inability of some stores to obtain a sufficient supply.

Effect of Promotion

Although the promotional program conducted by the Florida Citrus Commission consisted only of special displays and in-store demonstrations featuring free

samples of the test juice distributed by trained demonstrators, it was attended by a substantial increase in sales of artificially sweetened juice. 9/ Special displays were generally established at end of aisle positions or other favorable store traffic locations. Point-of-purchase display materials used featured the themes "new" and "low calories". In addition, a calorie-count card of the test juice and other foods was attached to individual cans of the test product. These cards were provided by the manufacturer of the artificial sweetener. All demonstrations were conducted on Thursday, Friday, and Saturday, with the 3-day perio considered as one demonstration.

Demonstrations were conducted in 17 of the 30 sample stores for 2 or more weeks during the 3-week promotion. A total of 25 demonstrations was conducted. The product was demonstrated in 8 stores during the first week of the promotion, 10 stores the second week, and 7 stores the last week.

Total sales of grapefruit juice in 46-ounce cans averaged about 425 percent more in demonstration stores than would have been normally expected if special displays of the test product and live demonstrations had not been present (fig. 9). However, sales data covering the 10-week postpromotion do not indicate any carryover effect which could be attributed to demonstrations conducted throughout the period of promotion.

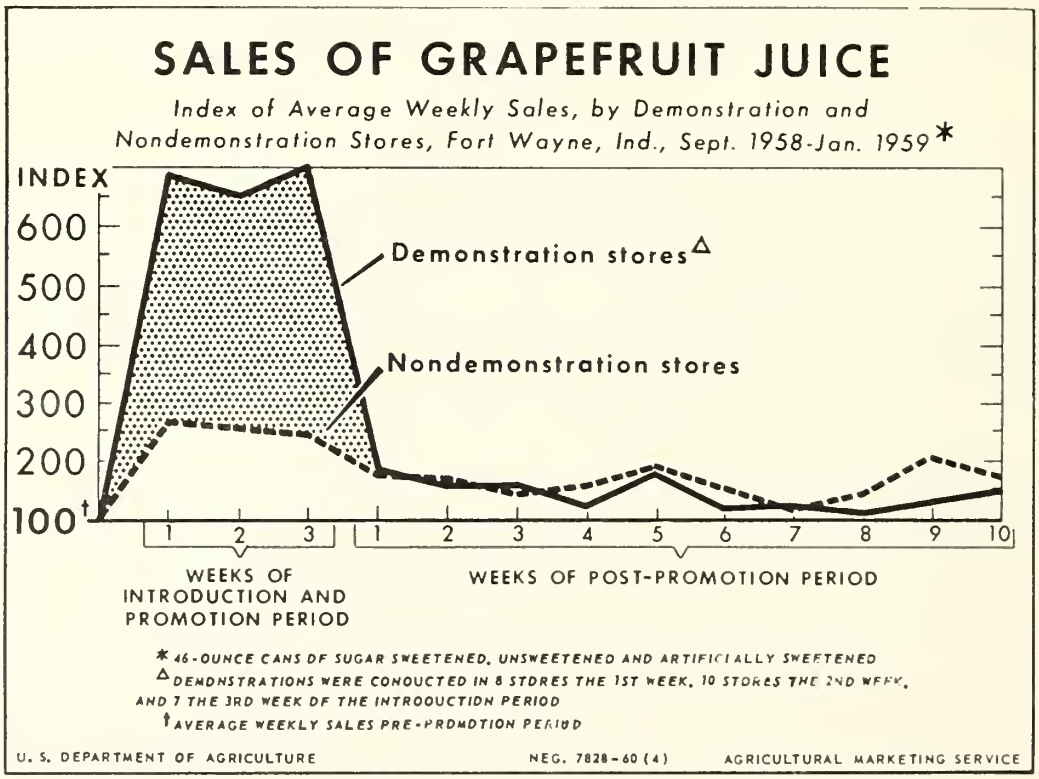
SALES OF GRAPEFRUIT JUICE
Index of Average Weekly Sales, by Demonstration and Nondemonstration Stores, Fort Wayne, Ind., Sept. 1958-Jan. 1959*
INDEX
600
500
400
300
200
100†
Demonstration stores△
Nondemonstration stores
1 2 3
1 2 3 4 5 6 7 8 9 10
WEEKS OF INTRODUCTION AND PROMOTION PERIOD
WEEKS OF POST-PROMOTION PERIOD
* 46-OUNCE CANS OF SUGAR SWEETENED, UNSWEETENED AND ARTIFICIALLY SWEETENED
△ DEMONSTRATIONS WERE CONDUCTED IN 8 STORES THE 1ST WEEK, 10 STORES THE 2ND WEEK, AND 7 THE 3RD WEEK OF THE INTRODUCTION PERIOD
† AVERAGE WEEKLY SALES PRE-PROMOTION PERIOD
U. S. DEPARTMENT OF AGRICULTURE
NEG. 7828-60 (4)
AGRICULTURAL MARKETING SERVICE

FIGURE 9

9/ Although there was no other promotion of the test product at any time during the study, reference to the study and test product was made on the food pages of the local newspapers, the Journal Gazette on Oct. 16, 1958, and the News Sentinel on Dec. 1, 1958. There was also an appearance of the Commission's merchandising representative on a public science radio program during the promotion period.

Average sales of nine stores in which demonstrations were conducted only during the second week of the promotion were eight times as great as in the first week and seven times as great as in the third week. In 6 stores in which demonstrations were conducted during the first and last week of the promotion average sales during the first week were almost 11 times as great as in the second week. During the third week, sales averaged about seven times greater than in the second week (fig. 10).

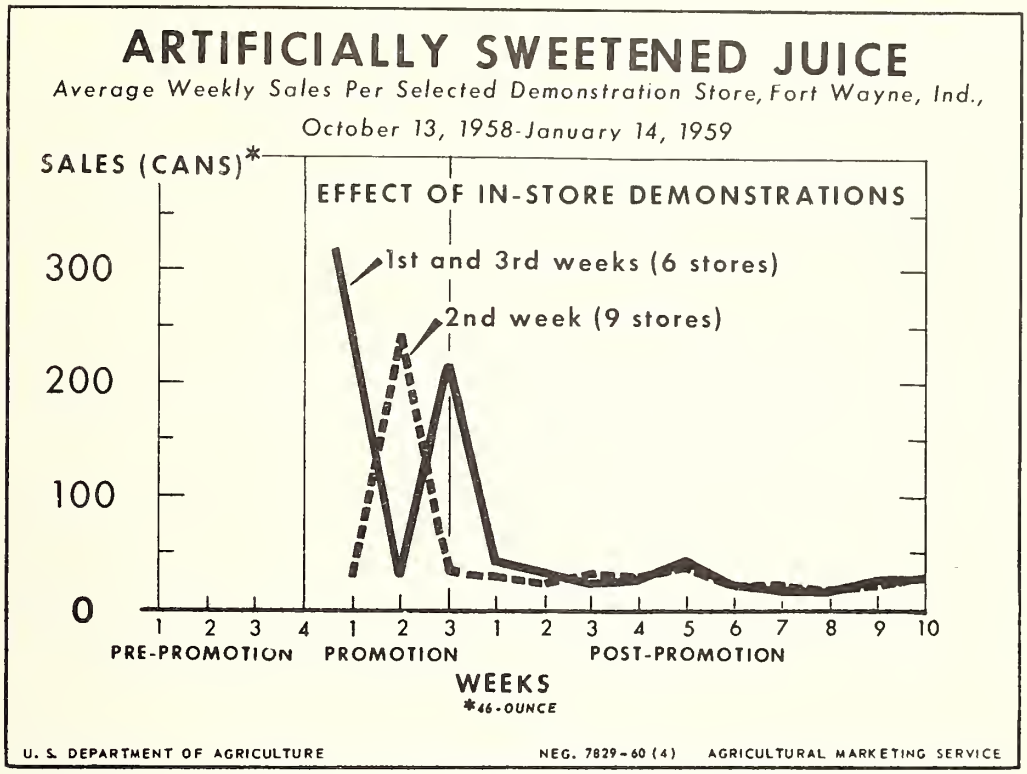

FIGURE 10

In the remaining 12 sample stores, demonstrations were not a part of the promotional effort. Point-of-purchase materials and displays were the only means of drawing the attention of potential customers to the test product. After artificially sweetened grapefruit juice was introduced in these stores, weekly sales of all grapefruit juice in 46-ounce cans were approximately 150 percent greater during the promotion period than would have been expected if the test product had not been available.

RESULTS OF SURVEY

Consumer Awareness of Promotion

This section of the report describes the effectiveness of promotional efforts in attracting consumer attention to artificially sweetened grapefruit juice, and in creating interest in using it.

Awareness of availability of artificially sweetened grapefruit juice.--The survey showed that 40 percent of the homemakers in Fort Wayne were aware that the test product was being sold in local grocery stores. Users of canned grapefruit juice were more likely than nonusers to know of the availability of the product; roughly half (54 percent) of the users compared with just under a third (29 percent) of the nonusers knew that the juice was available (table 2).

The promotional campaign attracted the attention of homemakers representing a wide range of background characteristics. Homemakers reporting awareness represented all age, educational, and income groups (table 3).

The estimate of awareness is, of course, subject to possible error if some respondents fail to recall a display which they may have been exposed to some 2 months before the interview. An effort was made, however, to stimulate recall and to assist respondents in identifying the juice about which they were being questioned by showing them a full-color, actual size picture of a can of the artificially sweetened juice. It is believed, therefore, that error due to forgetting is small.

Source of awareness.--After being shown an actual-size picture of a can of the test product, respondents were asked whether or not they had seen a display of this juice in the stores where they shopped, been offered a sample taste by a demonstrator, or heard friends or neighbors speak of it.

Four respondents in 10 reported that they had noticed the special displays in their grocery stores and 2 in 10 said they had been offered a sample taste of the product. Users of canned grapefruit juice were about twice as likely as nonusers to recall having seen a display or having been offered a taste by a demonstrator. Negligible proportions of homemakers said they had heard friends or neighbors talking about the artificially sweetened juice (table 4).

Store displays maintained over a period of time were more effective in creating awareness of the availability of the test product, but demonstrations were more effective in stimulating consumer interest in buying it. Seven homemakers in 10 who had bought the product did so after they observed a demonstration compared with 3 in 10 who only saw a display.

Awareness of the product as an innovation.--Respondents who reported that they were aware of the availability of the product were asked, "Do you recall what it is about this new brand that makes it different from other brands?"

The replies to this question indicated that most of these aware respondents had not paid sufficient attention to the displays or to the demonstrators' explanations to be able to recall what differentiated the artificially sweetened juice from other grapefruit juice. About 3 in 10 of the aware respondents gave a reply that could be considered correct. The proportion of correct replies was larger among buyers of the test product than among other homemakers, but even in this group more than half the answers were incorrect. Only 4 in 10 buyers of the new product knew that the juice was flavored with a noncaloric sweetener. Among other users of canned grapefruit juice about 3 in 10, and among nonusers of grapefruit juice just 2 in 10 correctly described the differentiating characteristics of the artificially sweetened juice (table 5).

Incidence of use of the artificially sweetened grapefruit juice.--The survey results show that 13 percent of the homemakers in the test city had bought the artificially sweetened grapefruit juice one or more times during the period of the market test. This result may be compared with the results of a market test of another citrus product, frozen grapefruit sections, which was conducted in Erie, Pa. in the late summer and fall of 1954. 11/ In the following tabulation the results of the present study are compared with the results of the market test of grapefruit sections:

	Grapefruit juice		Grapefruit sections	
	Percent		Percent	
Aware.....	---	40	---	50
Bought one or more times....	13	---	16	---
Aware but did not buy.....	27	---	34	---
Not aware.....	---	60	---	50

The promotion of grapefruit sections, which included radio, television, and newspaper advertising as well as point of sale promotion, was more successful in creating awareness of the test product than the promotion of grapefruit juice. In spite of this, the use of point of sale promotion only in this test was almost as successful as the earlier test in stimulating interest in buying the product.

About 13 percent of all homemakers in the sample had tried the test product. About 30 percent of the users of grapefruit juice, about the same percentage of all aware respondents, and over half of the aware respondents who use grapefruit juice bought the artificially sweetened juice during the period of the market test (table 6).

Among homemakers who were grapefruit juice users, purchases of the test product showed some relation to background characteristics: Younger homemakers and those in the lower income group were less likely to have tried it (table 7).

Homemakers' Opinions of the Artificially Sweetened Grapefruit Juice

In an earlier section of this report it was shown that a majority of the homemakers, even those who were users of artificially sweetened juice, were unable to describe the distinguishing characteristic of the test product, that is, the noncaloric sweetening agent. Survey results show, however, that the product appealed strongly to consumers.

Reasons for satisfaction with the artificially sweetened grapefruit juice.--Homemakers who had used the artificially sweetened juice were asked, "What did you think of it?" The question was completely nondirective in that

11/ Branson, R. E., Jacobs, Milton, and Hall, Richard. Frozen Grapefruit Sections: Evaluating a New Product by Retail Sales Audit and Household Survey. U. S. Dept. Agr. Mktg. Res. Rpt. 110, 62 pp., illus. Washington, D. C. December 1955.

it permitted respondents to reply in terms either of their satisfactions or dissatisfactions with the product. In reply to this question, 9 out of 10 respondents reported only favorable opinions of the juice.

The distribution of favorable replies to the question is shown in the following tabulation:

References to flavor -	Percent
Right sweetness	54
Fresh taste	32
Good taste	15
Right tartness	8
References to noncaloric sweetener -	
Like artificial sweetener	13
Low in calories	9
Other reasons -	
Good for you	4
Miscellaneous	4

Nearly all the favorable replies to this question referred to flavor. The juice was described as being of "just the right sweetness" or tasting "fresh" rather than canned, or as "just good." Only 2 respondents in 10 made any reference to the noncaloric sweetener.

This result is not surprising, since only 4 in 10 of the users of the test product were aware that it was flavored with a noncaloric sweetener.

A grapefruit juice of the quality used in this market test can thus be expected to compete effectively with other high grade grapefruit juices. Its appeal is also enhanced for some people because of its non-nutritive sweetener. The full potential strength of this advantage, however, cannot be measured from this test because of the samll proportion of people who were made aware of the differentiating characteristic of the new product.

Prospects for Continued Use and the Effect on the Market for Grapefruit Juice

In assessing the market potential for a new product it is important to know not only how much of the product is sold during the period of the market test and the proportion of consumers who have bought it, but also whether or not buyers of the product are sufficiently well satisfied to purchase it repeatedly.

Frequency of use.--Survey results show that about two-thirds of the homemakers who had used the artificially sweetened grapefruit juice had bought it more than one time, and half of these repeat purchasers had bought it four or more times during the period of the test. Frequency of use of the artificially sweetened juice was closely related to frequency with which other grapefruit

juice was used before the introduction of the test product. Among frequent users of canned grapefruit juice, only 1 in 10 had bought the artificially sweetened juice just once and nearly 6 in 10 had bought it 4 or more times; whereas among infrequent users over 6 in 10 had bought it only once, and just under 1 in 10 had bought it as often as 4 times. This suggests that many of those who were heavy users of grapefruit juice became regular users of the new product during the brief test period (table 8).

Likelihood of continued use.--Most buyers of the test product, even those who had used it only once during the test period, expected to continue using it. Respondents were asked, "If grapefruit juice like this continues to be sold in the stores where you shop, do you think you would buy it again from time to time?" In reply, 9 out of 10 said they would.

The few respondents who did not intend to buy it again were asked why they didn't. Several said the juice was too sour, and several more said they did not need low calorie foods. Only one homemaker expressed a dislike for artificial sweetening agents.

Effect on the market for grapefruit juice.--Many of the respondents who tried the new juice felt that their consumption of grapefruit juice had increased during the test period. Homemakers who had bought the new product more than once were asked, "Since you have been buying this grapefruit juice do you think you are using more, less, or about the same amount of grapefruit juice as you were using before?" In reply to this question -

51 percent said they were using more
45 percent said they were using the same amount as before, and
4 percent said they were using less

This finding is consistent with the results of the store audits which showed that in the 10 weeks following the introduction of the new product sales of all canned grapefruit juice were 53 percent higher than in the 4-week period before artificially sweetened juice was introduced.

Limits to the Market Potential for an Artificially Sweetened Grapefruit Juice

The market potential for any new form of a product is limited by a number of factors. One of these factors is a disinclination on the part of some consumers to use a particular product regardless of form. Another limiting factor is the existence of established taste preferences and brand loyalties, and finally, an artificially sweetened product may be handicapped by unfavorable attitudes of some people toward the use of artificial food additives. A number of questions were, therefore, asked during the interview to provide a measure of the extent of these limitations.

Reasons for not using canned grapefruit juice.--The principal reason nonusers of canned grapefruit juice give for not using it is that they consider it too tart, sour, or bitter. This criticism, expressed by about 7 homemakers in 10 who do not use canned grapefruit juice, is often accompanied by a statement of preference for fresh or frozen grapefruit juice or for some other fruit juice.

Another reason for nonuse, mentioned by as many as 1 respondent in 10, referred to the physical discomfort some people experience after drinking a sharply acid beverage. Although this latter group probably could not be attracted to the use of a sweetened juice, it seems possible that people who usually consider grapefruit juice too tart might find a sweetened juice palatable.

The use of canned grapefruit juice and competing citrus juices in the test city.--More than 4 in 10 homemakers in Fort Wayne (43 percent) reported that in the previous year they had used canned grapefruit juice, and a slightly larger proportion (47 percent) had used canned orange juice. However, the most popular of the juices asked about is frozen orange juice; about 7 homemakers in 10 (72 percent) were users of this product. Both users and nonusers of canned grapefruit juice were equally likely to use frozen orange juice. Blends of these juices and blends with pineapple were used by 1 or 2 homemakers in 10 (table 10).

There is some evidence from the survey of a change in pattern of use. This resulted from the increased price of orange juice during the preceding year. Respondents were asked a series of questions to determine whether or not they were aware of this increase and whether it had affected their consumption of orange juice. About one-third of the respondents reported that they had noticed an increase in price. About 4 in 10 of these said they were buying less orange juice because of it; 24 percent said they had not increased purchases of other juices as a result; 18 percent reported that they were buying more of some other juices. Juices mentioned as substitutes included tomato, pineapple, grapefruit, and various blends (tables 11, 12).

Established preferences.--The test product can be expected to appeal most strongly to consumers who prefer a sweetened to an unsweetened juice. About half of the canned grapefruit juice users said they prefer a sweetened juice; this proportion is somewhat higher among the infrequent than among the more frequent users of canned grapefruit juice (table 13).

The new product must compete in a market where many consumers have established brand loyalties. About 3 canned grapefruit juice users in 10 customarily buy a brand which they feel is superior in taste qualities to others they have tried. It seems likely, however, that a grapefruit juice of the quality provided for this test could compete quite strongly with juices already on the market (table 14).

Apprehensiveness about food additives.--An artificially sweetened juice may be handicapped by adverse attitudes consumers may have toward food additives. In reply to a direct question concerning sweetening foods artificially, 50 percent of the respondents said they considered this a good idea; 25 percent had no opinion about it; and the remaining 25 percent said they considered this a bad idea. Actually, three-fourths of the market ranged between neutral and favorable. In addition, the test product was probably not handicapped because, as noted earlier, many homemakers were unaware that the grapefruit juice was artificially sweetened. When canned grapefruit juice users who were aware of the availability of the test product were asked why they hadn't bought it, none of the replies referred to an unwillingness to use a product which had been artificially sweetened. Instead, the chief reason for not having bought this grapefruit juice was that the respondent had not been shopping for grapefruit juice at the time she noticed the test product. Only about 5 respondents in 100

aid they thought the juice was intended for people on a diet. A similar proportion said the 46-ounce can was too large for the needs of the family.

The Need for Low Calorie Foods

Increasing awareness of the adverse effects of obesity on the health has led many people to restrict their consumption of high calorie foods. To provide an estimate of the market potential for this product, a number of items were included in the questionnaire to obtain data on the extent of the problem of obesity and of public concern about it.

Extent of the problem.--Information was obtained from the respondents during the interview on the heights and weights of members of their households. Although no completely satisfactory norms are available for determining ideal weights, it is possible to specify limits beyond which adults of given heights may be considered overweight (table 15). On the basis of the reported weights and heights of the adults in the sample it is estimated that about one-third of the people over 18 years of age in the households sampled weigh more than is desirable.

The problem of obesity is more common among women than among men. About 43 percent of the women compared with 26 percent of the men weighed more than they should. Overweight was also more common among older than among younger people; among both men and women, people over 50 years of age were about twice as likely as people under 35 to be overweight. Both men and women in households in which the homemaker had received only elementary school education were more likely to be overweight than people in households where the homemaker had had more years of formal education. The relationship between income and obesity was not statistically significant (table 16).

Concern with obesity.--Respondents were asked if any members of their households were concerned about overweight; those who answered in the affirmative were asked to identify the specific person. The proportion of homemakers who reported that they or their husbands considered themselves overweight corresponds closely with the proportions of men and women who were classified as overweight (table 17).

The relationship between age and concern and homemakers' education and concern, however, did not correspond with the relationship between these characteristics and being classified as overweight. For example, a lower proportion (28 percent) of the women under 35 years of age were overweight than were concerned about weight (37 percent), while a higher proportion (63 percent) of the women over 50 were overweight than were concerned about it (47 percent). Apparently older people and those from households where the homemaker had less education, though more likely to be overweight, are less likely to be concerned about it. Younger people and those from families where the homemaker had more formal education, on the other hand, though less likely to be overweight are more likely to be concerned about it (tables 16 and 17).

Dieting.--Weight control diets are followed by only about 1 person in 10 or by about one-third of the people who should restrict their consumption of calories. Such dieting is more likely to be followed by women than by men (table 18).

It seems likely that these results underestimate the number of calorie-conscious people who eat moderately but who do not consider this to be dieting. Consequently the proportion of consumers to whom the use of non-nutritive sweetener should appeal is somewhat larger than the proportion who report that they are on a diet.

In addition to the people who report that they are on a weight control diet, another 5 in 100 report that they diet because of a health condition that prevents their use of sugar (table 19).

CONCLUSIONS

In conducting this research, an attempt was made to duplicate, as nearly as possible, normal and realistic conditions both in terms of product and market so that the research findings would be meaningful to the industry. Although the goals in this respect were generally reached, several qualifying factors and considerations should be taken into account.

The test product used in the Fort Wayne study, while produced in a commercial plant rather than in a pilot plant, may have been of higher and more uniform quality than would be expected of a product more extensively produced. Nearly all homemakers who tried the juice liked it. Certainly, unless a juice of similar quality can be produced, the same degree of success cannot be attained.

Artificially sweetened juice of only one level of sweetness was used in the test. This was a juice of the same apparent sweetness as a sugar-sweetened juice of an 11 brix-acid ratio. Previous research indicates that consumers generally prefer sweetened juice; they also prefer both sweetened and natural flavored juices of a 9 or higher brix-acid ratio. But, it is possible that artificially sweetened juice of a different degree of sweetness might not have received the same ready acceptance as the test juice used.

Another factor to be considered is the favorable price that prevailed for artificially sweetened juice. At a price averaging between 1 and 2 cents per 46-ounce can higher than the test juice, sugar-sweetened juice was sold in slightly larger volume than before the introduction of artificially sweetened juice. On the other hand, the almost 3-cent lower price of artificially sweetened juice compared with unsweetened juice may have been a factor contributing to lower sales of the last-named item.

Display space devoted to all canned grapefruit juice was 35 percent higher in the postpromotion than in the prepromotion period, although there was a decline of about 14 percent in the space devoted to regular grapefruit juice. With the keen competition existing for retail food store display space today, the expectation of obtaining a similar increase in display space in a more extensive marketing effort may be questionable.

Although only 13 percent of Fort Wayne homemakers bought artificially sweetened juice during the test, such response appears favorable in view of the promotion effort, the length of the study period, and the number of regular grapefruit juice users in the market. The high promotion of users making repeat purchases, and their general satisfaction with the product, indicate a

continuing demand for the product. Intentions do not make sales, but the fact that a high proportion of users said that they would continue to buy the product if it were available lends support to a favorable market for artificially sweetened grapefruit juice.

Despite the several qualifying factors, sales audit and consumer survey findings indicate that artificially sweetened juice was favorably accepted by Fort Wayne consumers. Although, strictly speaking, the results obtained can be applied only to the test market, they do lend good support to the expectation that a commercially produced product equal in quality to that tested could likely be marketed successfully if supported by adequate promotion and merchandising activities.

APPENDIX

Technical Notes

Seasonality index factors.--The 12-month--2-month moving average technique, with data for the years 1952-58, was employed to compute seasonal indices of consumption for all products audited except canned and frozen grapefruit sections. Because of limited historical data, the seasonal factor for canned grapefruit sections was computed by using a simple average of monthly purchase data for a 3-year period. No seasonal adjustment was undertaken for purchases of frozen sections because of insufficient data.

Indices for frozen concentrated grapefruit juice and blends containing grapefruit juice were established from purchase data for frozen concentrated juice other than orange.

All indices were based upon monthly purchase volumes of U. S. consumers reported in the Agricultural Marketing Service series "Consumer Purchases of Fruits and Juices."

The following tabulations show the monthly indices covering only the test months: 1/

Month	Canned juices				Canned grapefruit sections
	Grapefruit	Tomato	Grapefruit blends	Frozen concentrated (excluding) orange	
September	92.1	88.9	90.1	97.0	100.0
October	101.9	98.3	94.5	91.7	101.5
November	91.5	104.1	91.3	85.7	86.1
December	86.3	93.7	89.8	85.7	68.4
January	97.0	109.3	102.8	98.7	81.3

1/ Weekly indices for correction of audit data for seasonal variation were derived by simple interpolation of monthly indices.

The household sample.--The sample of consumer households was drawn by area probability techniques in clusters averaging 10 households each. It was designed to be representative of all households within the city of Ft. Wayne and adjacent areas outside the corporate limits in the vicinity of cooperating retail stores. To increase the efficiency of the sample, households within four blocks of cooperating stores were drawn with a probability of selection

four times the probability of selection of households outside these areas. In analyzing the results, households in areas in which the smaller sampling fraction was used were multiplied by four to give them a weight equal to that of households closer to the cooperating stores.

In addition to this basic sample a supplementary sample was drawn in which only users of the test product were interviewed. This was done to insure the collection of enough opinion data on the product to support the conclusions drawn from the study.

Sample variability.--Data obtained by sample survey are subject to sampling error and may differ somewhat from the results of a complete census. However, statistical techniques are available for estimating the magnitude of this difference. For example, survey results indicate that 13 percent of the homemakers in Fort Wayne had bought the artificially sweetened grapefruit juice one or more times during the period of the market test. The chances are about two out of three that value obtained from a census would fall between 10.6 percent and 15.4 percent.

Estimates of the magnitude of error due to sampling are also required when comparisons are made between subgroups within the sample. For example, the study showed that 37 percent of the women in the upper income group were overweight as compared with 44 percent in the middle income group. The chances are about one in three that a difference as large as this would occur if there were in fact no difference between the proportions of overweight women in these two groups.

The formula used for determining confidence intervals was:

$$1.50\sqrt{\frac{pq}{n}}$$

where p is the proportion of respondents possessing a given characteristic,

q is the proportion of respondents not possessing the characteristic (100-p), and

n is the number of cases.

The formula used for determining the significance of difference between subgroups within the sample was:

$$1.50\sqrt{\frac{p_1 \quad q_1}{n_1} + \frac{p_2 \quad q_2}{n_2}}$$

where p, q, and n have the same meanings as before and the subscripts refer to different subgroups.

The factor 1.50 in both formulas was used to correct for the effects of clustering. Experience with samples similar in design to the one used in this survey indicates that this weighting provides a satisfactory correction for formulas used in making estimates from simple random samples.

Table 2.--Relation between use of canned grapefruit juice and awareness of the availability of the artificially sweetened juice

Awareness	All homemakers	Homemakers who --	
		Use canned grapefruit juice	Do not use canned grapefruit juice
	Percent	Percent	Percent
Aware of availability --------	40	54	29
Not aware of availability ----	60	46	71
Total ----------	100	100	100
Number of homemakers ---	468	211	257

Table 3.--Relationship between background characteristics of the respondents and their awareness of the availability of the artificially sweetened juice

Characteristics	Homemakers who were --		Total	Homemakers 1/
	Aware of availability	Not aware of availability		
	Percent	Percent	Percent	Number
All homemakers ----	40	60	100	468
Homemakers' age:				
Under 35 --------	41	59	100	142
35 to 50 --------	42	58	100	157
51 and over -----	37	63	100	152
Family income:				
Upper ----------	39	61	100	126
Middle ----------	45	55	100	141
Lower ----------	34	66	100	114
Homemakers' education:				
College ---------	39	61	100	100
High school -----	42	58	100	260
Elementary school	35	65	100	104

1/ Numbers add to different totals because information on background characteristics was not obtained from some respondents.

Table 4.--Relationship between use of canned grapefruit juice and source of awareness of the availability of the artificially sweetened juice

Source of awareness	All homemakers	Homemakers who --	
		Use canned grapefruit juice	Do not use canned grapefruit juice
	Percent	Percent	Percent
Displays:			
Yes	37	56	26
No	63	44	74
Not ascertained	1/ *	--	*
Total	100	100	100
Number of homemakers	468	211	257
Demonstrations:			
Yes	22	29	12
No	77	70	87
Not ascertained	1	1	1
Total	100	100	100
Number of homemakers	468	211	257
Friends or neighbors:			
Yes	4	4	4
No	96	96	96
Not ascertained	*	--	*
Total	100	100	100
Number of homemakers	468	211	257

1/ Asterisk denotes less than 1 percent.

Table 5.--Replies to the question, "Do you recall what it is about this new brand of grapefruit juice that makes it different from other brands?"

Replies	Aware homemakers		Users of test product		Other users of canned grapefruit juice		Nonusers of canned grapefruit juice	
	Percent		Percent		Percent		Percent	
Correct replies		31		44		27		21
Sweet and nonfattening	10		10		10		10	
Artificial sweetener	9		12		6		7	
Nonfattening	7		9		10		3	
Brand name of sweetening agent	3		8		--		--	
Brand name of sweetening agent--low calorie	2		5		1		1	
Incorrect replies		1		2		--		--
Not ascertained		3		1		4		2
Don't know		65		53		69		77
Total	100		100		100		100	
Number of homemakers	187		59		152		257	

Table 6.--Proportions who bought the artificially sweetened grapefruit juice among all respondents, canned grapefruit juice users, respondents who were aware of the availability of artificially sweetened grapefruit juice, and aware respondents who use canned grapefruit juice

Awareness and use of canned grapefruit juice	Homemakers who --		Total	Homemakers
	Bought test product	Did not buy test product		
	Percent	Percent	Percent	Number
All homemakers	13	87	100	468
All users of canned grapefruit juice	30	70	100	211
All aware homemakers	32	68	100	187
Aware homemakers who use canned grapefruit juice	56	44	100	108

Table 7.--Relationship between background characteristics of the respondents and purchase of the artificially sweetened juice

Background characteristics	Homemakers who use canned grapefruit juice and who --		Total	Homemakers 1/
	Bought test product	Did not buy test product		
	Percent	Percent	Percent	Number
All homemakers	30	70	100	211
Homemakers' age:				
Under 35	21	79	100	53
35 to 50	34	66	100	71
51 and over	37	63	100	77
Family income:				
Upper	28	72	100	60
Middle	33	67	100	66
Lower	15	85	100	49
Homemakers' education:				
College	26	74	100	44
High school	30	70	100	117
Elementary school	33	67	100	50

1/ Numbers add to different totals because information on background characteristics was not obtained from some respondents.

Table 8.--Replies to the question (asked of respondents who had bought the artificially sweetened juice), "How many times have you bought it?"

Number of times	All users of test product	Users of test product who serve canned grapefruit juice --		
		Frequently	Moderately	Infrequently
	Percent	Percent	Percent	Percent
Once	35	10	30	65
Two or three times	33	33	37	25
Four or more times	31	57	33	7
Not ascertained	1	--	--	3
Total	100	100	100	100
Number of homemakers 1/	117	33	40	39

1/ Information on frequency of use of grapefruit juice was not obtained from some respondents.

Table 9.--Relationship between background characteristics of the respondents and use of canned grapefruit juice

Background characteristics	Homemakers who --		Total	Homemakers 1/
	Use canned grapefruit juice	Do not use canned grapefruit juice		
	Percent	Percent	Percent	Number
All homemakers ---------	43	57	100	468
Homemakers' age:				
Under 35 ----------	36	64	100	142
35 to 50 ----------	45	55	100	157
51 and over ----------	46	54	100	152
Family income:				
Upper ----------	44	56	100	126
Middle ----------	47	53	100	141
Lower ----------	36	64	100	114
Homemakers' education:				
College ----------	41	59	100	100
High school ----------	44	56	100	260
Elementary school ----	45	55	100	104

1/ Numbers add to different totals because information on background characteristics was not obtained from some respondents.

Table 10.--Use of selected citrus juices and blends in the preceding year

Juices used	All homemakers	Homemakers who --	
		Use canned grapefruit juice	Do not use canned grapefruit juice
	Percent 1/	Percent 1/	Percent 1/
Frozen orange juice	72	70	73
Canned orange juice	47	67	32
Canned grapefruit juice	43	100	--
Canned orange-grapefruit blend	24	39	13
Frozen orange-grapefruit blend	14	18	11
Frozen orange-pineapple blend	13	12	15
Frozen grapefruit-pineapple blend	11	11	12
Frozen grapefruit juice	10	14	7
Number of homemakers	468	211	257

1/ Percentages total more than 100 because many respondents use more than one juice.

Table 11.--Replies to the question: "In the past few months have you noticed an increase in the price of any of the juices that you buy?" and (asked of those who said "Yes") "What juice was this?"

Replies	All homemakers	
	Percent	
Yes, had noticed an increase in price		35
Mention orange juice	33	
Do not mention orange juice	2	
No, had not noticed an increase in price		65
Total		100
Number of homemakers		468

Table 12.--Replies to the questions (asked of respondents who mentioned price increase for orange juice) "Have you been buying less orange juice because of this increase in price?" and (asked of respondents who said "Yes") "Since you have been using less orange juice have you been using more of some other juices?"

Replies	Homemakers who mentioned price increase for orange juice	
	Percent	
Buying less orange juice		42
Buying more of some other juice	18	
Not buying more of some other juice	24	
Not buying less orange juice		58
Total		100
Number of homemakers		153

Table 13.--Replies to the question, "Which do you like better, sweetened grapefruit juice or unsweetened grapefruit juice?"

Replies	All canned grapefruit juice users	Homemakers who serve canned grapefruit juice --		
		Frequently	Moderately	Infrequently
	Percent	Percent	Percent	Percent
Prefer sweetened -------	53	44	45	62
Prefer unsweetened -----	47	56	55	38
Total ---------	100	100	100	100
Number of homemakers 1/	211	39	78	90

1/ Information on frequency of use of grapefruit juice was not obtained from some respondents.

Table 14.--Replies to the question, "Is there only one brand of canned grapefruit juice that you like best or do you like all brands about the same?"

Replies	All canned grapefruit juice users	Homemakers who serve canned grapefruit juice --		
		Frequently	Moderately	Infrequently
	Percent	Percent	Percent	Percent
Prefer one brand -------	30	33	34	26
Like all brands the same	70	67	66	74
Total -----	100	100	100	100
Number of homemakers 1/	211	39	78	90

1/ Information on frequency of use of grapefruit juice was not obtained from some respondents.

Table 15.--Optimum weight range for adult men and women of different heights 1/

Height in inches	Weight in pounds	
	Men	Women
	Pounds	Pounds
56-57		95-120
58-59		100-125
60-61	115-145	105-130
62-63	120-150	110-135
64-65	130-160	115-145
66-67	135-170	120-150
68-69	140-175	130-160
70-71	150-185	
72-73	155-195	
74-75	160-200	

1/ Data obtained from Household Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture.

Table 16.--Relationship between background characteristics of respondents and their being overweight

Characteristics	Adult females					Adult males				
	Over-weight	Not over-weight	Not ascer-tained	Total	Cases	Over-weight	Not over-weight	Not ascer-tained	Total	Cases
	Percent	Percent	Percent	Percent	Number	Percent	Percent	Percent	Percent	Number
All family members ---	43	56	1	100	463	26	70	4	100	389
Individuals' age:										
Under 35 ----------	28	71	1	100	142	19	78	3	100	127
35 to 50 ----------	37	61	2	100	156	23	74	3	100	146
51 and over --------	63	36	1	100	148	36	57	7	100	104
Family income:										
Upper -------------	37	61	2	100	126	30	67	3	100	121
Middle ------------	44	56	1/*	100	141	21	72	7	100	133
Lower -------------	45	54	1	100	110	24	72	4	100	75
Homemakers' education:										
College -----------	29	70	1	100	100	15	81	4	100	80
High school --------	39	59	2	100	258	23	72	5	100	233
Elementary school --	66	34	*	100	101	45	53	2	100	73

1/ Asterisk denotes less than 1 percent.

Table 17.--Relationship between background characteristics and replies to the question, "Are any members of this household concerned about being overweight?"

Characteristics	Adult females					Adult males				
	Yes	No	Not ascertained	Total	Cases	Yes	No	Not ascertained	Total	Cases
	Percent	Percent	Percent	Percent	Number	Percent	Percent	Percent	Percent	Number
All family members ---	41	58	1	100	463	21	78	1	100	389
Individuals' age:										
Under 35 ----------	37	60	3	100	142	13	84	3	100	127
35 to 50 ----------	42	58	--	100	156	25	75	1/*	100	146
51 and over --------	47	53	--	100	148	23	77	--	100	104
Family income:										
Upper -------------	44	56	--	100	126	25	75	--	100	121
Middle ------------	42	56	2	100	141	23	75	2	100	133
Lower -------------	36	64	--	100	110	6	94	--	100	75
Homemakers' education:										
College -----------	39	60	1	100	100	30	69	1	100	80
High school --------	41	57	2	100	258	17	81	2	100	233
Elementary school --	45	55	--	100	101	18	82	--	100	73

1/ Asterisk denotes less than 1 percent.

Table 18.--Relationship between background characteristics and replies to the question, "Are any members of this family on a reducing diet?"

Characteristics	Adult females					Adult males				
	Yes	No	Not ascertained	Total	Cases	Yes	No	Not ascertained	Total	Cases
	Percent	Percent	Percent	Percent	Number	Percent	Percent	Percent	Percent	Number
All family members ----	16	82	2	100	463	7	91	2	100	389
Individuals' age:										
Under 35 ----------	15	82	3	100	142	4	91	5	100	127
35 to 50 ----------	19	79	2	100	156	10	89	1	100	146
51 and over --------	15	85	--	100	148	3	94	3	100	104
Family income:										
Upper -------------	19	80	1	100	126	7	90	3	100	121
Middle ------------	19	79	2	100	141	9	88	3	100	133
Lower -------------	9	91	--	100	110	1	99	--	100	75
Homemakers' education:										
College -----------	17	81	2	100	100	13	82	5	100	80
High school --------	14	84	2	100	258	5	93	2	100	233
Elementary school ---	19	79	2	100	101	4	93	3	100	73

Table 19.--Relation between background characteristics and replies to the question, "Are any members of this household on any other kind of diet that prevents them from using sugar?"

Characteristics	Adult females					Adult males				
	Yes	No	Not ascertained	Total	Cases	Yes	No	Not ascertained	Total	Cases
	Percent	Percent	Percent	Percent	Number	Percent	Percent	Percent	Percent	Number
All family members ----	7	91	2	100	463	4	94	2	100	389
Individuals' age:										
Under 35 ----------	3	94	3	100	142	2	95	3	100	127
35 to 50 ----------	3	95	2	100	156	6	94	1/*	100	146
51 and over --------	14	85	1	100	148	3	93	4	100	104
Family income:										
Upper ----------	4	96	--	100	126	3	95	2	100	121
Middle ----------	3	94	3	100	141	3	95	2	100	133
Lower ----------	12	88	--	100	110	6	92	2	100	75
Homemakers' education:										
College ----------	3	96	1	100	100	5	95	*	100	80
High school --------	4	94	2	100	258	3	94	3	100	233
Elementary school ---	17	81	2	100	101	3	94	3	100	73

1/ Asterisk denotes less than 1 percent.

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